LSA BIOLOGICAL STATION
UNIVERSITY OF MICHIGAN

Smitten with the Mitten

Stunning lakes both Great and small, blue ribbon trout streams, expansive forests, picturesque prairie and farmland. More than 10,000 miles of shoreline. The largest freshwater resource in the world, ringed with some of the most abundant freshwater coastal wetlands on Earth. Enchanting views, with more than 3,500 species of plants and animals native to those landscapes. People may think first about Michigan's shape, but it is what is inside the mitten that makes Michigan so special, and Northern Michigan – the tip of the Mitt – is perhaps the best part of all.

Scientific researchers and students at the University of Michigan Biological Station appreciate the wonders of Northern Michigan just as much as any tourist driving through, and we are motivated to contribute our expertise to protect and restore this wonderful part of the country.

Setting a Trout River Free: The Maple River Dam

The Maple River Dam, located only a few miles from the Biological Station, is typical of the tens of thousands of small dams built around the country at the turn of the last century. Opened in 1905 to bring electricity and industrial productivity to nearby Pellston, the dam was abandoned in the early 1920's and has not served its intended purpose ever since.

As with thousands of similar dams around the country, while the dam may not be serving its intended use, it is not harmless. Ecological disruption and river habitat alteration, combined with the cost of maintaining the dam and the prospect of catastrophic failure, has led to a decision to remove it. Removal will revitalize one of Northern Michigan's best trout streams and restore other native fish species, as well. However, dam removal, now scheduled for the spring of 2018, must be done carefully to avoid damage downstream. Care must be taken to preserve the surrounding habitat where many species have made their home during the past century.

> Removing the dam must be done carefully to avoid damaging the river habitat downstream.

A multi-disciplinary team of scientists from the Biological Station – experts in fish, algae, insects, plants, fresh water ecology, and more – are collaborating with local partners to comprehensively assess the flora and fauna in and around the Maple River in 2017 before the dam is removed. We will continue sampling in 2018 and beyond to assess the impacts after removal. To the best of our knowledge, no other dam in the country has been studied at this level of ecological detail. The Biological Station study of the Maple River Dam can become a model assessment for dam removal elsewhere in Michigan and around the world.

To learn more about the Biological Station or make a donation, visit www.lsa.umich.edu/umbs

Restoring Wetlands at Lake Huron

Wetlands are critical to the health of the Great Lakes ecosystem. They are used as spawning sites by many fish species and stopovers and feeding grounds for migrating birds. They are home to hundreds of species of plants, insects, amphibians, and reptiles. Wetlands also act as 'filters' that remove and process nutrients that are carried into the aquatic system through runoff water, helping to buffer the open lake system from these pollutants.

Over the past several decades, increasing pressure from a suite of invasive plant and animal species has threatened coastal wetland biodiversity and function. Researchers at the Biological Station are working in Cheboygan in a wetland area that has been invaded by hybrid cattail, a species that prevents native plants from growing and prevents many animals from using the wetland. Our goal is to restore the wetland's function and biodiversity while finding uses for the biomass that this invasive plant produces.

In a large-scale experiment on Lake Huron and the St. Mary's River, researchers have mechanically cleared substantial sections of cattails from several wetlands and are monitoring the effect of this removal on regeneration of the wetland plant community. We are setting up an innovative, large-scale restoration experiment that creates channels to help fish and other organisms access habitat that has been blocked by cattail invasion. Researchers are also investigating whether the removed cattail material can be used as a biofuel by converting it to compost and pellets.

Researchers harvest hybrid cattails.

Pinpointing Mercury Pollution Threats to Local Fish & Wildlife

The northern Great Lakes region is particularly sensitive to mercury pollution, a notorious toxic metal particularly dangerous to both human health and wildlife. People are exposed to this pollutant, which has been accumulating across our region for many decades, by eating certain kinds of fish. Concentrations of mercury in the sportfish of Northern Michigan – particularly walleye, large and small mouth bass, pike, and drum – commonly exceed safe levels. Of course, mercury is also of concern to the abundant wildlife in the area that eat fish, such as loons, mink, otter, and eagles.

Scientists at the Biological Station have been monitoring the sources and distribution of mercury pollution in the Burt Lake watershed to assess its environmental fate. Using sophisticated electronic equipment, we monitor its deposition onto land, the chemical reactions that determine its movement through forest and swamp, and its ultimate loading into the lake and fish. As coal-fired power plants convert to natural gas and atmospheric mercury concentrations decrease, this work will contribute practical information on what to expect in our food chain.

Students dissecting fish for mercury analysis.

Protecting a Beloved Great Lakes Shorebird

Piping Plovers, a beloved shorebird species of the Great Lakes, were down to only 13 pairs in the Great Lakes area by the time the federal government listed them as an endangered species in 1986. In the years since this listing, scientists at the Biological Station have spearheaded an annual program to locate, protect, and monitor all nesting pairs of Piping Plovers in the Great Lakes region. Nests are comprehensively surveyed and observed to identify vulnerability. Abandoned eggs are salvaged and capture-reared, and birds are banded to monitor their annual migration patterns and population trends. Since efforts began, the population of Great Lakes Piping Plovers has steadily increased to its current size of approximately 75 breeding pairs, and the population is considered to be well on its way to recovery.

Great Lakes Piping Plover chicks at the captive rearing facility at UMBS.

Investigating Troubling Algal Blooms

Biological Station researchers, along with experts from Tip of the Mitt Watershed Council and Michigan State University, are studying a mysterious proliferation of golden brown benthic algae in crusty mats at the bottom of beautiful Torch Lake, a lake previously not subject to problem algae blooms. What's fueling this aesthetic nuisance? Theories include invasive mussels, heavy ice cover over previous winters, residential and agricultural runoff, and outdated septic systems. Scientists are collecting data on water quality, sediment, nutrient concentrations, and other environmental factors to solve the mystery and inform a future management plan.

Results will be useful to more than one location; although Torch is receiving the most attention, the brown algae has also been spotted by air in Lake Charlevoix, Lake Bellaire, Elk Lake, Walloon Lake and Grand Traverse Bay.

Eliminating Zebra & Quagga Mussels in the Great Lakes Region

Zebra and quagga mussels are notorious invasive species that have severely disrupted the ecology of both the Great Lakes and inland lakes in Northern Michigan. With their uncontrolled growth, these invaders have altered the algal food supply in our lakes, shifting fish populations. They have outcompeted native mussel species critical to ecosystem equilibrium and lake health. Their overabundance has damaged ships, boats, and water intakes by clinging to structures and clogging them.

At Round Lake, collaborating with Tip of the Mitt Watershed Council and researchers from other institutions, scientists at the Biological Station are investigating an innovative approach to controlling zebra and quagga mussels through the application of Zequanox®, a biological control product. Monitoring before and after application, we will evaluate control efficacy of this innovative product and assess the viability of larger-scale application and native species restoration. As a core component of this work, researchers will involve and inform stakeholders throughout the Great Lakes region of our results.